

ENHANCING CONVERSATION SKILLS IN PATIENTS WITH ALZHEIMER'S DISEASE USING A PROSTHETIC MEMORY AID

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The effectiveness of teaching Alzheimer's disease subjects to use a prosthetic memory aid when conversing with familiar partners was evaluated. Effects of the training of three topics by caregivers was assessed in daily probes with the experimenter and twice weekly probes with a familiar conversational partner. All 3 subjects learned to use the memory aid with both conversational partners and improved the quality of their conversational content. Subjects made significantly more statements of fact and fewer ambiguous utterances after training on each topic according to a multiple baseline design. All subjects also generated novel, untrained statements in conversations with both partners. Treatment effects were maintained at high levels throughout training and at 3- and 6-week follow-up sessions. Naive judges rated baseline and posttreatment conversational samples as significantly improved on all eight conversational dimensions.

DESCRIPTORS: Alzheimer's disease, spouse training, prosthetic memory aid, conversation skills, maintenance

The conversation skills of individuals with Alzheimer's disease reflect progressive cognitive and language deterioration (Bayles, 1984). Initially mild symptoms (topic digression, word finding difficulty, and pragmatic errors) are replaced by more ego-centric, confused, and perseverative conversations in the later stages of the disease. Semantic deficits are particularly noticeable in that nonspecific terms such as "thing" and "this one" replace substantive nouns, resulting in vague and "empty" speech (Nicholas, Obler, Albert, & Helm-Estabrooks, 1985).

Little has been done to attempt to stem this progressive degeneration of communication skills in Alzheimer's disease and other dementia patients through behavioral treatment. Commonly held assumptions concerning the degenerative nature of

the disease, the limited ability of patients to learn new information, and the expected lack of maintenance of trained skills have discouraged speech-language pathologists from attempting therapeutic programs that might help to overcome the communication deficits of patients with Alzheimer's disease (Golper & Rau, 1983). Families may be counseled to implement management techniques (Mace & Rabins, 1981) and to simplify language demands (Ostuni & Santo Pietro, 1986). This common-sense approach, however, is not empirically based.

Reviews of research conducted in long-term care settings have revealed promising approaches to the treatment of behavioral deficits and excesses exhibited by elderly dementia patients (Burgio & Burgio, 1986; Carstensen, 1988; Hussian & Davis, 1985; McEvoy, 1989). Changes in communication behavior have often been the goal of intervention. Verbally aggressive outbursts (Spayd & Smyer, 1988), negative accusations (Green, Linsk, & Pinkston, 1986), and paranoid speech (Carstensen & Fremouw, 1981) have been shown to decrease, and social interaction to increase (Blackman, Howe, & Pinkston, 1976; Carstensen & Erickson, 1986; MacDonald, 1978), when features of the physical environment are changed and when reinforcement contingencies are implemented. Specific skills, such

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as telephone conversational skills (Praderas & MacDonald, 1986) and reality orientation (Folsom, 1968; Greene, 1984; Hanley, 1984; Powell-Proctor & Miller, 1982), have shown modest improvements through multicomponent training approaches. In contrast, increased nonsensical and incoherent verbalizations and decreased effective communication behaviors (such as asking questions and making statements of fact or opinion) were observed when social interaction was increased (Carstensen & Erickson, 1986).

The widespread use of reality orientation therapy (RO) (Folsom, 1968) in nursing homes has provided many opportunities for evaluation of language-based procedures designed to maintain previously acquired behavior and to encourage greater levels of independence. Reviews of RO therapy are generally encouraging (Greene, 1984; Hanley, 1984; Powell-Proctor & Miller, 1982); however, a number of methodological problems make interpretation of findings difficult: (a) Investigators have used groups comprised of heterogeneous populations; (b) assurance that the treatment was applied systematically and consistently by all therapists to all patients has been lacking; (c) investigators have failed to monitor individuals' daily progress and to continue treatment until criterion levels of performance for individuals have been attained; and (d) measurement systems used to assess treatment and generalization effects have been limited. Furthermore, when monitored, maintenance of treatment effects generally has been disappointing (Barnes, 1974; Greene, Nichol, & Jamieson, 1979; Hart & Fleming, 1985).

In spite of the weakness of the RO literature, results of these studies suggest the efficacy of specific procedures. For example, Hanley (1981, 1986) demonstrated the relative effectiveness of memory aids (diary, RO board, signposts) for maintaining orientation facts and personal information facts in senile dementia patients. Similarly, Hanley and Lusty (1984) demonstrated the relative effectiveness of two memory aids (watch and diary) on the verbal orientation and memory for appointments behaviors of an 84-year-old senile dementia patient. When trained to use the memory aids, this subject

successfully responded to requests for personally relevant information and kept scheduled appointments without reminders from the staff. The potential of memory aids to enhance conversational behavior in dementia patients has not yet been explored.

To enhance the likelihood that patients with Alzheimer's disease will retain the use of memory aids, an examination of the use of caregivers as intervention agents is warranted. Training in a familiar setting with familiar agents was anticipated to provide the necessary contextual cues to elicit and maintain desired behaviors. Researchers who trained family members (Green, Linsk, & Pinkston, 1986; Pinkston & Linsk, 1984) reported success with the majority of skills taught and maintenance of treatment effects up to 6 months after treatment termination. Notwithstanding the difficulty and costly proposition of training and monitoring family members training in the home, the potential for effecting behavioral changes in both the patient and the caregiver, for slowing down the deterioration of desired skills in the patient, and for delaying institutionalization seemed desirable.

The purpose of this study was to evaluate the effectiveness of teaching caregivers to train an Alzheimer's disease patient to use a prosthetic memory device during conversations with familiar partners. Specifically, this study was designed to determine the extent to which middle-stage Alzheimer's disease patients used the memory aid to provide appropriate statements of fact (trained and untrained) during conversations, and the degree to which ambiguous, perseverative, and unintelligible utterances were affected by the use of the memory aid. In addition, the extent to which participation in the treatment program effected changes in the caregivers' perceptions of patient behavioral improvement and their own level of burden was monitored.

METHOD

Participants

Subjects. The subjects were 3 women (59 to 66 years old) who were diagnosed by a board-certified psychiatrist as exhibiting "probable Alzheimer's

disease," according to procedures established by the NINCDS and ADIRDA Work Group (McKhann et al., 1984). Subjects had a history of progressive intellectual decline and impaired mental status that could not be explained by other neurologic or psychiatric illnesses. None of the subjects had a prior history of drug or alcohol abuse. Subjects all resided at home with their husbands, were not receiving any other speech or language therapy, passed a hearing screening at 35 dB HTL at 500, 1,000, and 2,000 Hz in the better ear, and did not exhibit any dysarthric speech patterns.

All subjects performed within the moderate dementia range (12–18/30) on the *Mini-Mental Status Examination* (MMSE) (Folstein, Folstein, & McHugh, 1975) within 4 weeks of their participation in this study. They demonstrated moderate to severe naming deficits (9–25/42) on the *Modified Boston Naming Test* (Huff, Collins, Corkin, & Rosen, 1986) and on the picture description subtest (6–10 content units) of the *Western Aphasia Battery* (Kertesz, 1982). Their reading aloud performance for simple declarative sentences (four to six words long) was virtually flawless (either zero or one error out of 25 possible).

Caregiver trainers. The husbands of the 3 subjects served as trainers in this study. The trainers ranged in age from 63 to 66, were either retired or self-employed in the home, passed a hearing screening, and scored between 27 and 30 on the MMSE.

Familiar conversational partners. Three women (2 neighbors and 1 daughter), ranging in age from 29 to 62, served as conversational partners during this study. All partners scored within the normal range on the MMSE and passed the hearing screening. The partners were kept naive to the purposes of the study. The experimenter, a certified speech-language pathologist, also served as a conversational partner.

Setting

All phases of this study were conducted in the homes of the subjects. Families identified a setting (either the dining room or kitchen table) for both the training and conversational sessions. Radios,

Table 1
Sample Experimental Stimuli and Topic Prompts

Topic 1: My Day
Topic Prompt: "Tell me about your day."
1. I get up and get dressed around 9:00 a.m.
2. Then I eat breakfast.
3. After meals I wash and dry the dishes.
Topic 2: My Life
Topic Prompt: "Tell me about your life."
1. I was born on April 30, 1924.
2. My parents were Mark and Fanny Baker.
3. My brothers are Jeff, Walt, Jack, and Edwin.
Topic 3: Myself
Topic Prompt: "Tell me about yourself."
1. My name is Sarah Michaels.
2. My husband's name is Sam Michaels.
3. My home is in Scarsdale, Pennsylvania.

stereos, and televisions were turned off during sessions. All sessions were audiorecorded (Sony TCM 5000EV cassette recorder). Conversational probe sessions were timed using a Markson digital countdown timer with electronic alarm.

Stimuli

The husbands assisted the experimenter in developing a master list of facts relating to topics of personal relevance to the subject and topics for which the subject may have been experiencing memory failures (e.g., names of family members, orientation facts, etc.). Ten facts for each of three topic areas were chosen; corresponding photographs taken by the experimenter or borrowed from family photo albums for each fact were obtained. When photographs were judged by the experimenter to be either ambiguous or impossible to obtain (e.g., doctor, breakfast, wedding), standard line drawings depicting facts were selected (*Touch 'n Talk*, Drolet & Hume, 1983). Ten simple declarative sentences were composed by the husband and the experimenter to represent the facts. Table 1 lists a sample of sentence stimuli and topic prompts for each of the three topics.

The printed sentences and the pictures or photographs were mounted on white paper (3 in. by 4 in.), laminated, and inserted into a plastic wallet (3.5 in. by 4.5 in.). By the end of the study, Subjects 2 and 3 had one wallet with the 30 stimuli

separated by tabs into the three topics. Subject 1, however, experienced difficulty using the tabs, so three wallets were used, one for each topic. Each wallet had the topic printed in black letters on the top of the wallet.

Data Collection

The experimenter conducted conversational probe sessions with the subjects four times per week. Wallets were not available to subjects during probe sessions until after the first treatment session; then wallets were always present, but their use was not prompted. These 5-min sessions began with the experimenter starting the countdown timer and stating one of the topic prompts, for example, "Let's talk about you; tell me about yourself." The experimenter responded appropriately to intelligible conversation by answering subject-initiated questions and by offering short acknowledgments when appropriate. The experimenter did not interrupt the subject's unintelligible or perseverative statements, but sat quietly, maintaining eye contact with the subject. At approximately 1.5-min intervals, the experimenter interjected the prompt to talk about the next topic, for example, "Great, now tell me about your day." The session ended when the countdown timer signaled that 5 min had elapsed. The order of initiating the three topics was counterbalanced across all sessions.

Conversational sessions were also conducted twice weekly with the partner. This person was instructed to have as natural a conversation as possible with the subject during the 5-min session, while interjecting the three topic prompts at approximately equal intervals and allowing the subject to respond to each prompt. Each of the three topic prompts were printed on an index card (3 in. by 5 in.) and given to the partner in counterbalanced order at the beginning of each session. The experimenter then put the audiorecorder in the record mode, started the countdown timer, and left the room. On days when both the experimenter and the partner conversed with the subject, the order of the two conversational dyads was counterbalanced across sessions.

Scoring

All probe sessions were transcribed verbatim by the experimenter, using standard punctuation and adding contextual notes. Each transcript contained the utterances for both the partner and the subject, numbered sequentially and identified for speaker. All scoring was done using the transcripts and supplemented by the audiorecordings when necessary. The following behaviors were coded:

1. *Trained on-topic statements* were one of the 30 training utterances produced intelligibly and unambiguously.

2. *Novel on-topic statements* were intelligible and unambiguous statements contributing additional correct content related to one of the training topics and/or training stimuli.

3. *Ambiguous utterances* were coded if they included (a) empty phrases (e.g., a common idiom contributing no content to the discourse), (b) indefinite terms (e.g., "stuff," "thing," "something," etc.), (c) deictic terms (e.g., "this," "that," "there," "here"), and (d) pronouns without antecedents.

4. *Unintelligible utterances* included neologisms; literal, verbal, semantic, and phonological paraphasias; sentence fragments; grammatically incomplete sentences; non-English phrases; and multiple joined sentence fragments.

5. *Perseverative utterances* repeated previously stated information (i.e., single words, phrases, or complete utterances).

6. *Error statements* were intelligible and unambiguous utterances related to the trained topics that expressed a fact that was false, as determined by the caregiver.

7. *Other utterances* included any intelligible and unambiguous speech acts such as questions or requests, responses to questions, organizational devices that served to regulate the conversation, acknowledgments, commands, social conventions, and any intelligible and unambiguous statement that expressed a fact about topics other than the three to be trained.

8. *Partner prompts* were the commands, "Tell me about _____," for each of the three topics.

9. *Partner statements* were comments upon a subject's utterance that provided additional content.

10. *Partner questions* were other requests for information that were not one of the specific partner prompts.

11. *Partner others* included acknowledgments of subject utterances and any other organizational devices that served to regulate the conversation.

Training Procedures

Caregiver training. Trainers 1, 2, and 3 began training on the treatment procedures after the third, fourth, and fifth baseline sessions, respectively. The training package included a short didactic introduction to the purpose and procedures of the training, an explanation of each of the response definitions, illustration of modeling and role playing the treatment procedures, and the attainment of reliability on scoring and recording procedures during role play. Trainers 1, 2, and 3 met criterion (95% to 100% accuracy for two consecutive role-play sessions) in six, eight, and five trials, respectively, on delivering all aspects of the treatment, including eliciting the targeted information, reinforcing correct responses, and recording responses on the data sheet. Reliability with the experimenter was estimated by comparing data sheets completed for each session by the experimenter and trainer and computing trial-by-trial agreement for all behaviors.

Communication wallet training. During twice-daily treatment sessions, the subject and trainer sat across from one another with the wallet, data sheet, pencil, and tape recorder on the table. The session began with the trainer giving the subject the wallet with the 10 stimuli for the first training topic and saying

Now we are going to practice having a conversation. This wallet has pictures and sentences that you can look at to help you remember what you want to say. Open it to the first page. Let's talk about your day. Tell me about your day.

The subject was praised for accurately reading the

sentences and for making accurate elaborations about the stimulus items; the trainer repeated and/or expanded the subject's utterances, then waited 5 s for the subject to initiate the next trial. If the subject did not turn the page and/or read the next sentence inaccurately, the trainer pointed to the sentence and said, "Wait, read this." If the subject was still unable to provide the accurate response, the trainer prompted the desired response using the forward-chaining procedure of reading the first word, pausing for the subject to continue, and continuing to read a word and to pause until the subject read the entire sentence.

Sessions continued until all 10 training items were read accurately. The trainer scored all subject responses and gave the data sheets and the recordings of the sessions to the experimenter daily to be coded for reliability and to ensure adherence to the treatment procedures. When the trainer was less than 90% accurate in delivering treatment (9 of 57, 3 of 40, and 5 of 48 sessions, respectively, for Trainers 1, 2, and 3), the experimenter reviewed the data sheets and recordings with him on the following day.

Treatment continued until the subject reached a criterion of 90% accuracy for four consecutive training sessions or until three conversational probes with the partner had been completed. Prior to treatment phase changes, the experimenter added the 10 stimulus cards for the new training topic to the front of the wallet and gave the trainer the corresponding data sheets for that topic.

Experimental Design

A multiple baseline design across behaviors (McReynolds & Kearns, 1983) was used to assess the effects of treatment on three conversational topics. In addition, a multiple baseline design across subjects was used to replicate the treatment effects and to demonstrate experimental control in the event of generalization to untrained topics.

Baselines were begun concurrently for all subjects on each of the three topics. Baseline for Topic 1 continued until responding was stable at a low level, until the trainer met criterion on the treatment

procedures, and until a minimum of three baseline sessions with the partner had occurred. Three additional baseline sessions with the experimenter were conducted after the trainer had met criterion to ensure that the trainer did not implement training procedures prematurely.

Treatment was initiated sequentially across topics for each subject and sequentially across subjects as treatment effects for each subject became evident. The introduction of topics was counterbalanced across subjects.

Maintenance for prior trained topics was monitored during treatment of subsequent topics. Long-term maintenance was assessed at 3 and 6 weeks posttreatment.

Reliability

Transcription. All recordings of conversational probes were transcribed using a Craig 2706A cassette transcription unit with earphones. An observer listened to a sample of all probe tapes (one baseline and one posttreatment probe session for each subject) and indicated any disagreements with the transcribed text of the probes by notating the transcriptions. Overall reliability was calculated by dividing the number of words in agreement by the total number of words in agreement plus in disagreement per transcript and multiplying by 100. This procedure yielded an overall agreement score of 97.8% (range, 94.4% to 99.7%).

Dependent variable. Point-to-point interobserver agreement was calculated by having the experimenter and an independent observer, who was trained to a 90% agreement criterion, score all the numbered utterances on 25% of all the transcripts from each phase of the study for each subject. Percentage of agreement was determined by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. The mean interobserver agreement for all utterances coded per probe session was 91% (range, 81% to 97%), 90% (range, 83% to 95.5%), and 87.5% (range, 82.3% to 93%) for Subjects 1, 2, and 3, respectively.

Independent variable. Interobserver reliability for the degree of adherence to the treatment pro-

cedures on the part of the trainers was determined for 100% of the treatment sessions for each subject/husband dyad. Reliability was calculated by dividing the total number of correct trainer behaviors by the total number of trainer behaviors and multiplying by 100. This procedure yielded mean agreement scores of 92% (65% to 100%), 96% (68% to 100%), and 96% (81% to 100%) for Trainers 1, 2, and 3, respectively. The mean interobserver agreement for all trainer-coded subject behaviors during treatment was 96% (60% to 100%), 97% (77% to 100%), and 97% (81% to 100%) for Trainers 1, 2, and 3, respectively.

Social Validation

A satisfaction rating procedure (McMahon & Forehand, 1983; Wolf, 1978) was implemented to determine whether the husbands and the partners could detect changes in the targeted behaviors over time. A *Satisfaction Rating Form—Caregiver Version* and a *Satisfaction Rating Form—Partner Version* were completed by each husband and partner at the termination of treatment. These rating forms (available from the author) solicited subjective responses to questions about specific features of the subjects' conversational behavior pre- and posttraining, the results of the treatment program, and the relative burden to the spouse of a variety of behavioral excesses and deficits exhibited by the subjects.

A social validation procedure (Kazdin, 1982) was also implemented to determine whether persons unfamiliar with the subjects and the targeted behaviors could detect changes in the subjects over time on a number of conversational dimensions. Nine speech-language pathologists (8 females, 1 male; age range, 23 to 35 years) rated six audiotaped samples, which consisted of one randomly selected baseline session with the experimenter and one randomly selected treatment session with the experimenter for each subject. All baseline samples were taken from the initial baseline phase before any topics had undergone training; all treatment session samples were taken from the final treatment phase, after all three topics had been trained. The six samples were dubbed onto a master tape ran-

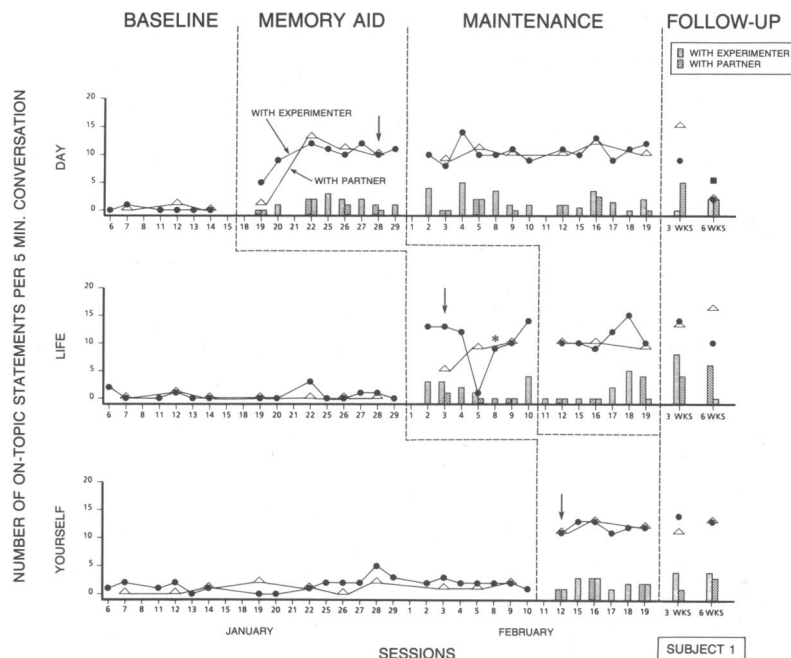


Figure 1. Number of on-topic statements by Subject 1 across topics and experimental phases. Line graphs represent the total on-topic statements made during 5-min conversational probes with the experimenter (●—●) and familiar conversational partner (△—△). Bar graphs represent the novel on-topic statements made during probes with experimenter (■) and partner (▨). The arrow indicates date training criterion was met. The asterisk denotes date trained topics were divided into separate wallets. ■ indicates performance without wallet prompts.

domizing order across subjects and phases. Judges listened to each sample through a stage monitor speaker (TOA Model SM-25M) and rated the session on a 7-point Likert-type scale for the dimensions of (1) making sense, (2) staying on topic, (3) providing lots of different information about each topic, (4) ambiguity of information provided, (5) appropriateness of conversational referents, (6) meaningfulness, (7) normality, and (8) comfort.

RESULTS

Communication Wallet Training

Subjects understood and performed the communication wallet training task with relative ease as reflected by low rates of trials to criterion and high levels of task accuracy. With the exception of Subject 1, who required 21 trials to criterion on her first topic, subjects required between four and eight trials to meet criterion per topic with accuracy ranging from 70% to 100%. Subjects provided few

untrained on-topic statements during training (zero to seven per topic).

Treatment Effects and Maintenance

The total numbers of on-topic statements (trained and untrained) per 5-min conversation with the experimenter and the familiar conversational partner are shown in Figures 1, 2, and 3 for each subject. Examination of the baseline phases across topics and subjects revealed a low and stable rate of performance for Subjects 1 and 2 and a somewhat higher and more variable rate of performance for Subject 3. Subjects tended to provide a few statements when prompted to discuss a topic, but appeared obviously frustrated at not being able to offer more information. Comments such as, "That's all there is about that," or "I can't think of anything else to say," occurred frequently during baseline.

During treatment phases, all subjects provided more on-topic statements, doubling or tripling their level of baseline performance. These differences can

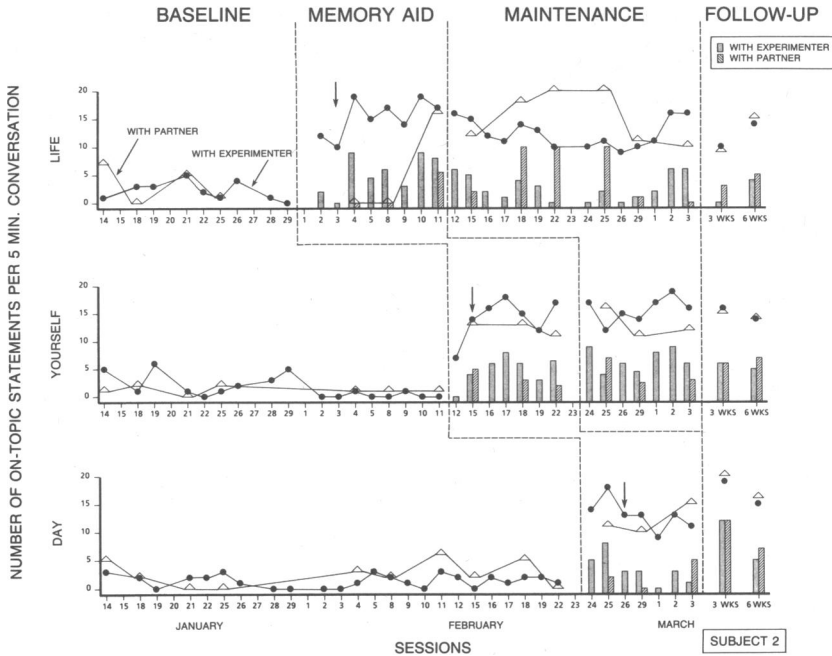


Figure 2. Number of on-topic statements by Subject 2 across topics and experimental phases. Line graphs represent the total on-topic statements made during 5-min conversational probes with the experimenter (●—●) and familiar conversational partner (△—△). Bar graphs represent the novel on-topic statements made during probes with experimenter (■) and partner (▨). The arrow indicates date training criterion was met.

be accounted for by the subjects' use of the wallet to prompt statements of the 10 trained facts and other novel on-topic statements related to those facts. Subjects typically demonstrated similar levels of performance with the experimenter and the partner. Subject 2 demonstrated a somewhat delayed effect with her partner.

With the exception of Subject 3, whose first trained topic performance returned to baseline levels temporarily, all subjects demonstrated maintenance of the trained behavior at levels comparable to treatment levels. Although Subject 3's performance dropped to baseline levels for the first trained topic, her comments about the repetitiveness of the task increased. An unfamiliar conversational partner was introduced to her in the last probe session. This partner was a certified speech-language pathologist who was familiar with the probe situation but naive to the subject and the purpose of the study. Performance on all three topics returned to the initially high levels of early treatment performance, and the number of trained statements was greater than the novel statements.

Maintenance of treatment effects was demonstrated at levels similar to those during treatment phases at the 3-week and 6-week follow-up visits for all 3 subjects. Only Subject 1 demonstrated a decline to baseline levels at the 6-week follow-up probe for Topic 1. This topic was probed without the corresponding wallet, which had been misplaced.

All subjects generated novel, on-topic statements related to specific training stimuli, as shown in Figures 1 through 3. Subject-specific differences in rate of novel statements were observed. Subject 1 had low but consistent rates of novel statements. Subject 2 had higher, but more variable rates of novel statements; these statements tended to be similar from probe to probe. For instance, after Subject 2 stated the training item, "My husband, Rex, is a retired dentist," she usually then added, "and he retired from the Veterans Administration." Subject 3, however, demonstrated a different pattern. Initially, her novel statements were similar to those emitted by Subjects 1 and 2, but after the third treatment probe, she began not to read the

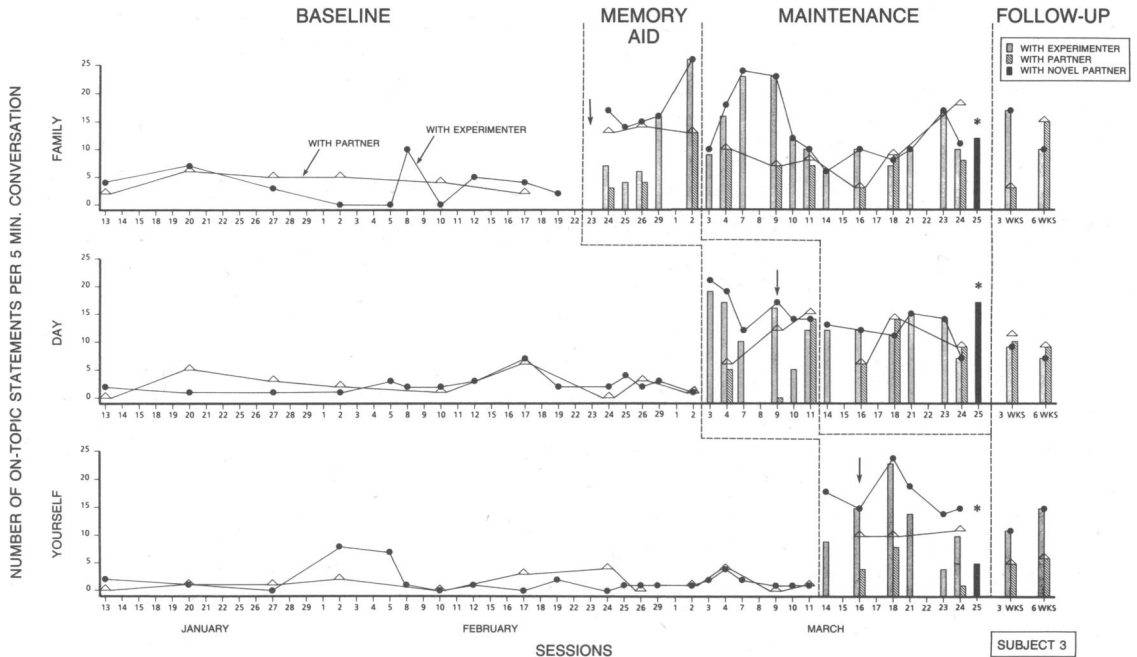


Figure 3. Number of on-topic statements by Subject 3 across topics and experimental phases. Line graphs represent the total on-topic statements made during 5-min conversational probes with the experimenter (●—●) and familiar conversational partner (△—△). Bar graphs represent the novel on-topic statements made during probes with experimenter (■) and partner (▨). The arrow indicates date training criterion was met. The asterisk represents performance with an unfamiliar conversational partner.

training items at all but to generate exclusively novel statements about each item. This resulted in most, and sometimes all, of her statements being novel, untrained statements related to the training stimuli for the remainder of the study.

Nontargeted Communicative Behaviors

The mean frequencies of all other utterance types per treatment phase, when conversing with the experimenter and with the partner, were examined. All subjects exhibited high rates of ambiguous utterances with both the experimenter (12.4 to 27.5) and the partners (9.8 to 30.3) during baseline; these decreased to low and stable rates following treatment (1.4 to 6.5 and 2.8 to 6.0, respectively). Subject 1's high rate of unintelligible utterances decreased as a function of increased topic training (from 9.8 to 1.0). Subjects 1 and 2's perseverative utterances increased (from 0.3 and 0 to 6.0 and 2.4, respectively), whereas Subject 3's decreased (from 1.9 to 0.8) over the course of treatment. The topography of Subjects 1 and 2's perseverative ut-

terances changed over time from repetitions of conversational fillers (e.g., "I don't know what else to say" or "That's about it") to repetitions of the trained sentences. In addition, decreases in error statements were observed for Subjects 1 and 2 (from 1.3 and 1.6 to 0.3 and 0.6, respectively).

The mean frequencies of topic prompts, questions, and statements made by the experimenter and the partners during the conversational probes were examined. Partners were generally consistent in the number of topic prompts given in each experimental phase. Decreases in the mean number of partner questions were observed (from 4 to 10 to 0.7 to 5.7). Similar decreases in statements were observed for Partners 1 and 3.

Social Validation

Satisfaction ratings. Results of the *Satisfaction Rating Form* completed by husbands following termination of treatment indicated that husbands detected few positive changes in their wives' conversations following treatment. Husband 1

understood his wife's conversation 50% of the time at pretreatment and 70% at posttreatment. Husband 2 saw no change; Husband 3 demonstrated a 10% decline from 80% to 70% comprehension over time.

Husband 1 reported a 20% improvement (from 70% to 90%) in the degree of sense his wife's conversation made; other spouses reported no changes. Husbands 2 and 3 reported 10% increases in their wives' difficulty remembering things over time; no changes were noted for Husband 1. Husbands 1 and 3 reported more frequent repetitive talking—from 60% to 90% for Husband 1 and from 70% to 80% for Husband 3.

The most annoying behaviors of their wives were reported overwhelmingly by the husbands *not* to be disruptions in communication. In fact, misplacing household objects, following the spouse around the house, and trying to leave the house were the three most annoying behaviors reported. Forgetting names of people, places, and events was usually reported midway down the ranked list of annoying behaviors. Other annoying communicative behaviors were reported even lower on the list.

Results of the posttreatment administration of the *Satisfaction Rating Form* to the partners were similar to those of the spouses. Partners understood subjects' conversation 90% to 100% of the time with no changes over time. Similarly, partners judged the subjects' conversation to make sense 75% to 100% of the time, with only Partner 3 reporting a 10% change in the direction of improvement at the end of treatment. Partner's judgments of memory for familiar things was similarly consistent from pre- to posttreatment; Subject 1 was judged to have difficulty remembering things 90% of the time and Subject 2 50% of the time. Only Partner 3 reported a small 10% decrease in Subject 3's memory. No changes were reported in subjects' repetitive talking, although the reported rates reflected individual subject differences (90%, 50%, and 0% for Subjects 1, 2, and 3, respectively).

Partners 2 and 3 reported that their respective subjects remembered more while using the wallet. Partner 2 also felt that Subject 2 discussed things in more depth, but only during probe situations.

Partners 1 and 2 felt that the wallet helped during the probes but that there was no carryover into everyday conversation.

Social validation. Table 2 shows the mean ratings obtained on each conversational dimension for baseline and treatment samples. These data reveal that subjects were rated as significantly improved on all dimensions following treatment. Subjects were rated as making more sense, staying on the topic longer, providing more varied and unambiguous information, and using appropriate referents more often than they did during baseline. Similarly, the conversational situation was judged to be more meaningful, more normal, and more comfortable.

DISCUSSION

This study evaluated the effectiveness of a treatment designed to improve the quality of conversation by subjects with Alzheimer's disease. The results revealed that 3 middle-stage Alzheimer's disease patients were able to learn to use a communication/memory wallet when conversing with familiar conversational partners and that the quality of the conversational content improved as a function of wallet use. Subjects made significantly more statements of fact per topic and fewer ambiguous utterances once they had been trained on the three individual topics. These findings support those of Hanley (1986) and Hanley and Lusty (1984), who successfully trained dementia patients to maintain orientation skills using memory aids.

Treatment effects were replicated across the 3 subjects and three topics; these effects were strong, representing increases more than doubling or tripling baseline rates of performance. All subjects demonstrated immediate awareness of the utility of the wallet in the conversational probe situation, as reflected by immediate treatment effects on probes with the conversational partners. Even Subject 1 demonstrated an immediate effect, despite the fact that she had not yet reached criterion in training. Because criterion-level responding was generally achieved so rapidly and subjects demonstrated little variability in accuracy of performance over time, it

Table 2
Results of Social Validation Procedure

Question	Mean baseline	Mean posttreatment	<i>t</i> value (<i>df</i> = 26)
Client makes sense	3.81	1.96	8.15*
Client stays on topic	4.41	1.96	6.96*
Provides lots of information	4.37	2.70	4.37*
Unambiguous information	4.15	1.78	8.09*
Appropriate referents	3.96	1.44	7.82*
Meaningfulness of situation	4.30	2.70	4.54*
Normality of conversation	4.52	2.67	5.08*
Comfort of situation	3.11	2.11	2.89*

Note. 7-point Likert-type rating scale (1 = good/normal; 7 = poor/disordered).

* Significantly different means, $p < .01$.

is not clear that training needed to be so frequent and continued for so long.

All subjects generated novel, untrained statements in conversations with both the experimenter and the familiar conversational partner. Differences in subjects' performance may have been related to treatment procedures. Subjects 1 and 2 seemed stimulus-bound to the wallet and may not have been aware that it was desirable to elaborate upon each statement. In fact, when prompted by the partner to discuss more about a particular topic, they often restated the trained statements without any apparent awareness that they had just said these same 10 items moments before. Changes in the treatment procedures (i.e., a specific prompt to provide novel elaborations for each stimulus item) might increase the frequency of novel statements and reduce the task-specific and rote nature of treatment sessions. Subject 3's use of the wallet stimuli to generate only novel elaborations after the third treatment probe may reflect a higher level of cognitive functioning compared with the other 2 subjects.

Treatment effects were maintained at high levels, both while other topics were being trained and at the 3- and 6-week follow-up sessions, with only two exceptions. Subject 1's 6-week follow-up probe for Topic 1 declined to baseline levels due to the loss of the Topic 1 wallet. This natural reversal of the treatment effect provides further evidence of the usefulness of the communication wallet. Subject 3 also demonstrated some decreasing trends in

maintenance phases. These declines were corrected, however, when a novel conversational partner was introduced to the probe setting. This effect may support the notion that Subject 3 was more aware of the pragmatic inappropriateness of discussing the same information with people known by her to be highly familiar with the information contained in the wallet. It would be interesting to conduct additional follow-up probes of this subject's wallet use with familiar and unfamiliar conversational partners as her dementia progresses.

These strong maintenance effects contrast with those from other studies in which treatment effects declined to baseline levels relatively quickly following treatment termination (Barnes, 1974; Greene et al., 1979; Hart & Fleming, 1985). The power of this treatment may well be the result of the salience of the communication wallet and its use as a common stimulus in both treatment and probe settings. In fact, the use of the wallet in both settings may have facilitated the occurrence of generalization to nontraining conversational settings.

The results of this treatment can also be seen in the concomitant effects on nontargeted conversational behaviors. Factual, unambiguous, and complete statements replaced the ambiguous attempts. Because the wallets could not provide all of the information subjects might have wished to share, they continued to make some ambiguous utterances in attempting to provide elaborations or statements about nonstimulus items. Declines in other detrimental communicative behaviors during probes were

observed as a result of treatment; the frequency of unintelligible, error, and perseverative utterances decreased for Subjects 1, 2, and 3, respectively.

Effects on Caregivers

The acquisition of training procedures by the husbands in this study confirms demonstrations of others that caregivers can be trained to implement behavioral programs reliably in the home (Green et al., 1986; Pinkston & Linsk, 1984). Husbands demonstrated high rates of adherence to treatment procedures, sometimes seeming overly strict in their interpretations of subject responses and implementing error correction procedures too often. This strict adherence to the treatment procedures, although a comforting demonstration of procedural reliability, may have had a less than optimal effect on the training situation. Although the subjects demonstrated highly accurate training scores, they offered very few novel, untrained statements related to the stimuli during treatment sessions.

Neither husbands nor partners reported any significant changes in the subjects or themselves over the 3- to 4-month period of this study. In fact, with the exception of Husband 2 (who attributed mild nighttime confusion or hallucinations to treatment) and Partners 2 and 3 (who felt Subjects 2 and 3 remembered more while using the wallet), the participants of this study generally did not notice the effects of treatment on subjects' conversational behavior. This contrasts with the naive judges' ratings of pre- and posttreatment conversational samples. All eight conversational dimensions were judged to reflect significant improvements.

There are several possible reasons for the failure by spouses and partners to report changes in subjects' communication behaviors. First, husbands functioned only as trainers in a training situation that was not very natural or facilitative of conversation between spouses. Second, specific procedures to ensure wallet use in situations other than probes were not implemented. Consequently, subjects were not reported to have used their wallets in other situations in which the husbands might have observed them. Third, familiarity with the subjects'

conversational content may have masked treatment effects. It is reasonable to expect that longtime friends and spouses would interpret as perfectly adequate statements that an unfamiliar interactant might consider ambiguous or unintelligible. Conversely, the programmed behavior change might have been viewed as highly contrived and repetitive and, therefore, aversive or not reinforcing.

Finally, failure to report changes in subjects' communication behaviors may also be related to the relative burden to the husbands of the many other disruptive behaviors exhibited by the wives. The fact that the most annoying behaviors did not change over time may have biased husbands against the treatment; they may have expected more from the treatment (i.e., the abatement of all disease symptoms). This finding is consistent with the findings of Haley, Brown, and Levine (1987), who interviewed 44 primary family caregivers of elderly patients with dementia. These caregivers rated behaviors such as agitation, embarrassing behavior, hallucinations, hiding things, and behavior dangerous to the patient as commonly occurring, quite stressful, and as problems that they were ill-equipped to handle. Other commonly occurring behaviors, and ones that could be considered communication related, such as disorientation and forgetting familiar people, were rated as quite low in stressfulness and relatively easy for caregivers to handle or ignore.

Questions remain regarding what changes in the treatment procedures are necessary to permit spouses and familiar conversational partners to detect or appreciate changes in conversational behaviors. It is imperative that future studies address this concern because, without acknowledgment of treatment gains as valuable changes in the subject (i.e., social validation) from those closest to the subjects, it may be difficult in the future to secure their cooperation in potentially useful treatment regimens.

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